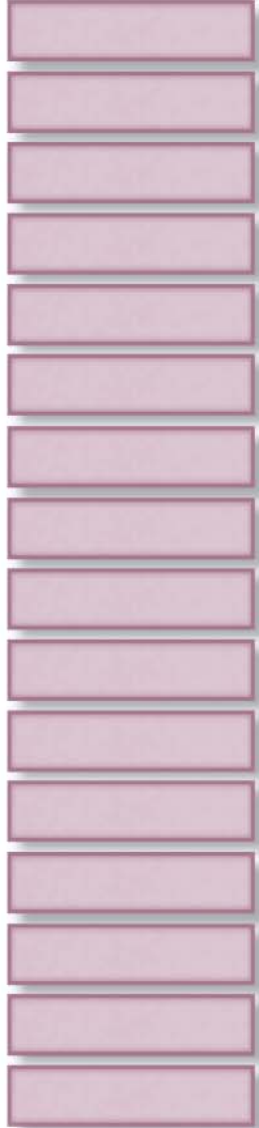


ISTEP+

Grade 5 Science Item Sampler



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Table of Contents

Letter from Dr. Suellen Reed	5
Introduction	6
Frequently Asked Questions	7
Science Grade 4 Indiana Academic Standards	11
Sample Test Items	12

Dear Colleague:

In this sampler, you will find information designed to guide, direct, and clarify your efforts in preparing for and administering Indiana Statewide Testing for Educational Progress-Plus (*ISTEP+*). We want your students to be prepared to pass *ISTEP+* every time they take the test, and we feel this sampler is an excellent instructional resource.

As a classroom teacher, your knowledge of the Indiana Academic Standards assessed on *ISTEP+* is very important. Your ability to use that knowledge in your instructional strategies with your students and your familiarity with all aspects of test administration are critically important to students' success on the test and with the rest of their coursework. You influence students' choices and futures as well as their academic achievement.

We expect that the information provided in this sampler will help you in your ongoing efforts to educate and motivate your students. Please see the Department of Education's Web site at **www.doe.state.in.us** for additional information about Indiana Statewide Testing for Educational Progress-Plus (*ISTEP+*).

Thank you for all you do to prepare students to meet the challenges they will face in this ever-changing and challenging world.

Sincerely,

A handwritten signature in black ink that reads "Dr. Suellen Reed". The signature is written in a cursive, flowing style.

Dr. Suellen Reed
Superintendent of Public Instruction

Introduction

The *Grade 5 Science Item Sampler* provides information about the *ISTEP+* Science test for students, parents, educators, and others affected by the test. The information in this sampler has been compiled by the Division of School Assessment of the Indiana Department of Education and CTB/McGraw-Hill, the test development contractor for Indiana.

The test items (questions) in this sampler are intended to provide teachers with specific examples of how the different standards will be measured on the test. These examples can serve as models when teachers are constructing test items for classroom assessment. The sampler is not a practice test. This book includes sample test items and scoring rubrics that reflect the Indiana Academic Standards for Science adopted in November 2000. All items included in this book are samples only and not actual items. All samples are representative of the types of items that students taking the *ISTEP+* Science Assessment at Grade 5 will be required to answer.

A condensed version of the Indiana Academic Standards is included in this sampler. These are the skills that all Indiana students are required to know and be able to perform. Complete copies of the Indiana Academic Standards can be obtained from the Department of Education's Web site at www.doe.state.in.us or directly from the Department of Education.

Frequently Asked Questions

Q. What is the *ISTEP+* Grade 5 Science Assessment designed to do?

- A.** This assessment measures students' mastery of the Indiana Academic Standards in Science taught in the grade levels **prior** to Grade 5. It is part of a statewide testing program designed to connect student learning, classroom instruction, school improvement, and educational goals. *ISTEP+* results provide information about the strengths and weaknesses of individual students as well as aggregate data about school, district/corporation, and state performance. The test is designed to permit inferences about student achievement in the critical knowledge and skill areas defined by Indiana's Academic Standards and to evaluate curriculum choices and instructional strategies. It is **not** intended that grade-level curricula be restricted to the content of this test. The required criterion-referenced test consists of two parts: the Basic Skills Assessment (multiple-choice items) and the Applied Skills Assessment (open-ended items).

Q. What are the Indiana Academic Standards?

- A.** In collaboration with state K–12 educators, the Indiana State Board of Education has adopted world-class standards for each grade level in Science. These learning outcomes require that Indiana schools have rigorous curricula aligned with state standards and that students learn the skills and knowledge deemed necessary for successful performances in school, at work, and in the community. *ISTEP+* testing for Grade 5 Science is based on the academic standards from **previous** school years. Therefore, testing in Grade 5 measures mastery of Indiana Academic Standards for Grades K–4 standards. While these standards set expectations for student learning, they do not prescribe how the standards should be taught. Teachers should use their considerable skills, experience, talents, and creative resources to design standards-based classroom instructional activities tailored to meet the individual needs of their students. Copies of the *Teacher's Edition of Indiana's Academic Standards* have been forwarded to all school administrators.

Q. In what ways are *ISTEP+* results linked to state and federal accountability?

- A.** Indiana is required by state and federal law to administer a statewide assessment program that systematically measures student performance and monitors progress toward pre-established goals by all schools. *ISTEP+* results are a primary component for educational accountability under both Public Law 221 (state) and No Child Left Behind (federal). Testing data are also used to inform local decision making and guide Continuous School Improvement initiatives.

Q. How are test items created for this assessment? How does Indiana ensure that the test items are valid and unbiased for our students?

- A.** Since 1987, in conjunction with a test development company (CTB/McGraw-Hill), Indiana educators have collaborated in all steps of the test design and item development process. Indiana teachers help determine how standards will be tested by providing to the test developer assessment guidelines for the standards. Teachers

review all test items to ensure that they are developmentally appropriate for the grade level and that they accurately measure the standards they were designed to assess. After additional reviews by the Citizens Review Committee and the Sensitivity Review Committee, items are evaluated on a pilot test form administered to Indiana students. Only items approved through these measures will appear on the actual *ISTEP+* assessments.

Q. How are test items scored?

- A. Multiple-choice (selected response) items are scored by machine in Salinas, California. Open-ended (constructed-response) items are read and electronically scored in Indianapolis by trained scorers. Scores on these items are based on correct answers as well as on level of understanding and ability to communicate. Rubrics guide scorers in assigning scores on the open-ended items. Each rubric contains a list of acceptable responses (exemplars) as well as a description of the level of performance for each score point. If a student gives a response that is not listed as an exemplar but is supported by the text, the student receives credit for the response. Anchor papers are selected for each designated score point of an item. These are used as guides for the scorers in scoring the applied skills sections.

Q. How does Indiana ensure that scoring is reliable?

- A. Potential scorers, who must be college graduates and meet other competitive qualification requirements, are screened carefully during two interviews. Once selected, scorers train for several days with actual student responses from item pilots and must pass a test before they begin to score “live” student responses. The scorers must continue to demonstrate proficiency in following established scoring guidelines throughout their terms of employment. To ensure that grading by all scorers consistently matches the guidelines established in the scoring rubric, the trained scorers are monitored closely by testing supervisors. Each scorer is administered a “checkset” (a set of pre-scored student responses) several times a day that compares his or her grades to those assigned by the supervisor. In addition, the team leader, who works with a team of nine scorers, randomly rescores a percentage of each scorer’s completed items. Finally, 5% of the total responses are rescored daily.

Q. What is the policy regarding rescoring items?

- A. Within a specified window of time, a student’s parent or guardian may request a rescoring of specific items from a student’s test. It should be stressed that the scores obtained through the rescoring will be final and that the rescoring may have positive, negative, or no effect on the final score. Scores resulting from rescoring items are unlikely to be more than a few points different from the original score.

Q. What practices are appropriate when *preparing* students for *ISTEP+*?

- A. It is important that students anticipate the tests with interest rather than with anxiety. They should realize that they are taking achievement tests that yield information

about the skills they have mastered as well as the skills they need to learn. Point out that questions intentionally cover a range of difficulty. The Department of Education's (DOE) policy about test preparation is that **any activity in the school or classroom that creates an excessive focus on the specific test content of *ISTEP+* for the purpose of artificially raising test scores, whether overt or inadvertent, is inappropriate.** The *Indiana Code of Ethical Testing Practices and Procedures* was created to assist in answering specific questions about what constitutes "excessive focus." This document has been distributed to schools and corporations and may be downloaded from the DOE Web site. For easy reference, the following is a summary of ethical practices.

It is considered **appropriate** to do the following:

- review with all students the skills and concepts taught in previous years (see classroom activities in *Curriculum Frameworks*)
- review *ISTEP+* objectives as part of a general review of curricula
- discuss general test-taking strategies
- talk with students and parents about academic expectations and the importance of setting specific performance goals that enable students to assume responsibility for their learning
- develop instructional objectives based on the Indiana Academic Standards
- use test results as part of a body of evidence in making informed decisions about individuals, educational programs, or curriculum

It is considered **inappropriate** to do the following:

- teach or "cram" *ISTEP+* content (that has not been previously covered) during the time period immediately preceding the examination
- call students' attention to the fact that a similar question will be on the upcoming *ISTEP+*
- review *ISTEP+* related skills and concepts with **only** those students to be tested
- select for review **only** those *ISTEP+* objectives or items on which students performed poorly on previous examinations or focus instructional objectives on specific test items
- copy test items for instructional use or make minor alterations in test items to construct study guides, worksheets, or classroom assessments specifically designed for test preparation purposes
- use current, past, or parallel *ISTEP+* test items as review materials except those authorized for such use by the DOE (the released Applied Skills items found in the *Teacher's Scoring Guide* for Grade 5 Science.)

NOTE: Duplication of any part of the test books constitutes a serious breach of security as some test items may appear in future versions of the test. Exposing students to test questions before testing invalidates test scores and denies students the opportunity to participate in testing.

Q. What practices are considered inappropriate *during* testing?

- A. • coaching students in any way (verbally or with gestures or facial expressions)
- using any mechanical or technical device during a session **not** approved for such use, except by students for whom such use is an authorized IEP accommodation
 - answering questions about test items or vocabulary
 - allowing noncertified personnel (e.g., aides or parent volunteers) to administer the test. Noncertified personnel, however, may serve as test proctors.

Q. How do I access more information about *ISTEP+* and other test-support resources?

- A. The Department of Education maintains a Web site at **www.doe.state.in.us** that provides immediate access to *ISTEP+* information as well as to legislative updates and information about the Indiana Academic Standards, accountability, school improvement, and professional development. The *ISTEP+* Web page, accessible from this site, includes a calendar with upcoming test dates, bulletins with current testing information, and a list of *ISTEP+* support documents that may be downloaded. These documents include the *Guide to Test Interpretation*; the item samplers for grades 3, 6, and 8, and the GQE; and the *ISTEP+ Program Manual*. **Multiple copies of *ISTEP+* support documents should be ordered through the school's Test Coordinator.**

Questions about assessment not answered in this sampler may be directed to Cynthia Roach (at **croach@doe.state.in.us**), Assessment Consultant. The School Assessment Division's telephone number is 317-232-9050, and the toll-free *ISTEP+* hotline is 888-544-7837 (888-54ISTEP).



GRADE 4 INDIANA ACADEMIC STANDARDS

- ❑ **The Nature of Science and Technology**
Students, working collaboratively, carry out investigations. They observe and make accurate measurements, increase their use of tools and instruments, record data in journals, and communicate results through chart, graph, written, and verbal forms.
- ❑ **Scientific Thinking**
Students use a variety of skills and techniques when attempting to answer questions and solve problems. They describe their observations accurately and clearly, using numbers, words, and sketches, and are able to communicate their thinking to others. They compare, explain, and justify both information and numerical functions.
- ❑ **The Physical Setting**
Students continue to investigate changes of Earth and sky and begin to understand the composition and size of the universe. They explore, describe, and classify materials, motion, and energy.
- ❑ **The Living Environment**
Students learn about an increasing variety of organisms—familiar, exotic, fossil, and microscopic. They use appropriate tools in identifying similarities and differences among them. They explore how organisms satisfy their needs in their environments.
- ❑ **The Mathematical World**
Students apply mathematics in scientific contexts. Their geometric descriptions of objects are comprehensive. They realize that graphing demonstrates specific connections between data. They identify questions that can be answered by data distribution.
- ❑ **Common Themes**
Students work with an increasing variety of systems and begin to modify parts in systems and models and notice the changes that result. They question why change occurs.

NOTE: This page provides an overview of the Indiana Academic Standards. The IDOE Web site at www.doe.state.in.us contains a complete version of the Indiana Academic Standards, which may be downloaded.

Sample Test Items

The Nature of Science and Technology

This standard assesses a student's understanding of how scientific investigations are conducted, when results are expected to be consistent and why they sometimes are not, how to communicate results and the importance of doing so, how measuring tools are used in science, and how technology affects society.

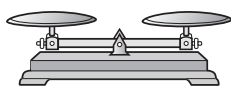
1 When a scientist makes a new discovery, other scientists often try to repeat the experiment. The results of the second experiment are expected to be

- ☒ very similar to the original
- ☐ more accurate than the original
- ☐ exactly the same as the original
- ☐ very different from the original

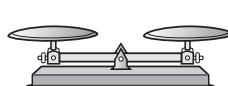
2 A team of scientists investigated a new treatment for a disease. Which of these is the LEAST important reason for the team to share their findings with other scientists?

- ☐ So other scientists can evaluate the investigation and results.
- ☐ So other scientists can learn about the investigation and results.
- ☒ So other scientists can congratulate the team on their investigation.
- ☐ So other scientists can develop new investigations based on the results.

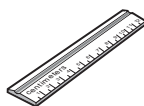
3 Kevin and Shannon want to investigate how far marbles of different masses will roll when released from the top of a ramp. Which of these sets of tools should they use for this investigation?



☒



☐



☐



☐



- 4** Students in two classes at the same school were keeping track of the weather during the same week in April. Every afternoon, the students measured the temperature and the amount of rain. When they compared their measurements, the students found some differences. Their measurements are shown in the tables below.

Measurements From Class 1

Day	Temperature (in °C)	Amount of Rain (in cm)
Mon	15	0
Tues	16	0
Wed	18	4
Thurs	14	2
Fri	15	1

Measurements From Class 2

Day	Temperature (in °C)	Amount of Rain (in cm)
Mon	15	0
Tues	17	0
Wed	18	3
Thurs	12	3
Fri	15	1

Give ONE example of how the measurements recorded by the two classes are different.

Suppose that the students in both classes were very careful and did not make any mistakes when they made their measurements. Give ONE reason that could explain why the measurements are different.

Key Elements:

How the measurements are different

One of the following:

- any valid specific difference in the temperatures recorded by the two classes
- any valid specific difference in the amount of rain recorded by the two classes

AND

Why the measurements are different

One of the following:

- any reasonable description of the classes measuring in different places in the school yard
- any reasonable description of the classes measuring at different times during the afternoon
- any reasonable description of the classes using different tools (with different levels of accuracy/precision)

Rubric:

2 points Two key elements

1 point One key element

0 points Other

Scientific Thinking

This standard assesses a student's ability to use a variety of scientific skills, such as explaining procedures, describing observations, using numerical data, describing and comparing results, and supporting explanations.

5 Students are investigating how far toy cars roll after being released down ramps. Which of these would be the LEAST helpful information to record in their notebook?

- ☐ the size of each car
- ☒ the color of each car
- ☐ the height of the ramp
- ☐ the distance each car rolled

6 Jada recorded weather observations every day during the school year. Her results for one school week are shown in the table below.

Weather Observations

Day	Sky Conditions	Temperature	Amount of Rain (in cm)
Monday	sunny	24°C	0
Tuesday	sunny	22°C	0
Wednesday	cloudy	16°C	4
Thursday	cloudy	17°C	1
Friday	partly cloudy	20°C	0

How much higher was the recorded temperature on Monday compared to Thursday?

- ☐ 4°C
- ☐ 5°C
- ☐ 6°C
- ☒ 7°C

- 7** Jeremy investigated how light affects the growth of tomato plants. His results are shown in the table below.

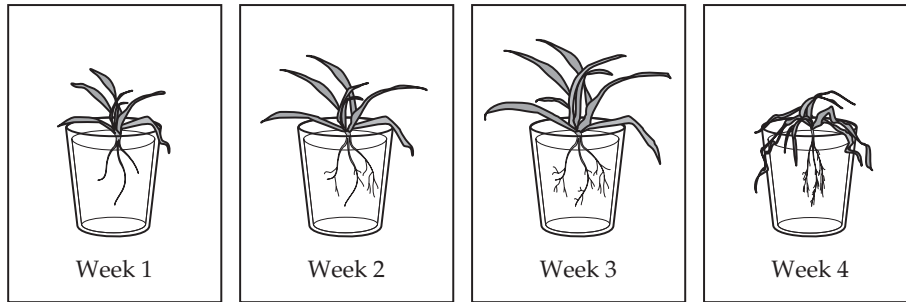
Height of Tomato Plants

Plant	Amount of Light	Height at Week 1 (in cm)	Height at Week 2 (in cm)	Height at Week 3 (in cm)
Plant A	sun, all day	3	10	18
Plant B	sun in morning, shade in afternoon	3	8	13
Plant C	shade, all day	3	5	8

Which of these statements correctly describes the information in the table?

- ☐ Plants A, B, and C grew at the same rate.
- ☐ Plant A was the shortest plant at week 1.
- ☐ Plant B was 13 centimeters tall at week 2.
- ☒ Plant C grew the least during the three weeks.

- 8** A student grew a plant in a glass of water and observed it for four weeks. Study the pictures of the plant taken each week during the investigation.



Describe the changes in the plant from week 3 to week 4.

Give ONE reason that might explain what caused the changes in the plant from week 3 to week 4.

Key Elements:

How the plant changed

- The plant changed from healthy/growing/ large in week 3 to unhealthy/dead/wilting in week 4.

AND

Why the plant changed

One of the following:

- change of location
- temperature increase/decrease
- light increase/decrease
- disease/insects/pests
- chemicals/fertilizer in water
- other plausible reason for the changes in the plant from week 3 to week 4

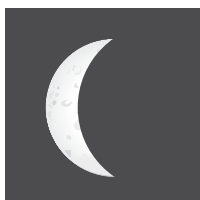
Rubric:

- 2 points** Two key elements
1 point One key element
0 points Other

The Physical Setting

This standard assesses a student's understanding of patterns related to objects in the sky, such as the sun and the moon; different Earth materials, such as air, water, rock, and soil; changes that occur on Earth and the causes of these changes, such as the night-and-day cycle; sources of energy, such as heat; and the effects of forces, such as a magnet pulling on an object.

- 9** The picture below shows how the moon looked in the sky one night.



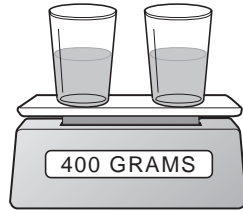
About how long will it be until the next time the moon looks exactly the same again?

- ☐ a year
- ☐ a week
- ☒ a month
- ☐ a season

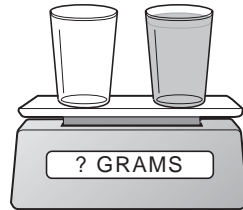
- 10** What causes the day and night cycle on Earth?

- ☐ Earth tilting on its axis
- ☒ Earth rotating on its axis
- ☐ Earth moving around the sun
- ☐ Earth moving behind the moon

- 11** The picture below shows two glasses of water on a scale.



The water in one glass is then poured into the other glass.



What should be the reading on the scale now?

- ☐ 200 grams
- ☒ 400 grams
- ☐ 600 grams
- ☐ 800 grams

- 12** Give TWO examples of how weather conditions change between winter and spring. Be sure to describe how each weather condition changes.

1) _____

2) _____

Key Elements:

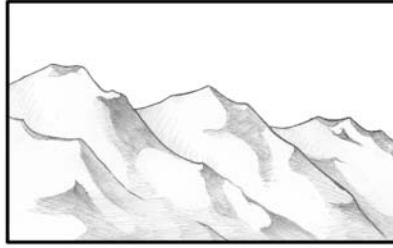
Any two of the following:

- The temperature is colder in the winter and warmer in the spring.
- Snow is more likely in the winter, and rain is more likely in the spring.
- Other reasonable description of a change in weather conditions that can occur between winter and spring

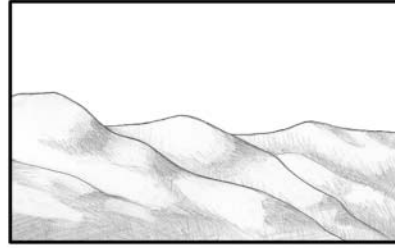
Rubric:

- 2 points** Two key elements
- 1 point** One key element
- 0 points** Other

- 13** The pictures below show how erosion changed a mountain range over time.



Many thousands of years ago



Today

List TWO natural processes that could have helped cause the erosion of this mountain range.

- 1) _____
2) _____

Key Elements:

Any two of the following:

- water/rain
- glaciers/ice
- wind
- landslides/rockslides/gravity

Rubric:

2 points Two key elements

1 point One key element

0 points Other

The Living Environment

This standard assesses a student's understanding of how organisms can be sorted and compared based on their features, behaviors, and interactions with the environment; how organisms interact with and depend on each other, such as for food and reproduction; how organisms experience a cycle of growth, reproduction, and death; factors that affect human health, such as diet and exercise; and how diseases caused by germs can be avoided.

14 Every animal's source of food can be traced back to

- ☐ insects
- ☒ plants
- ☐ other animals
- ☐ germs in the soil

15 Germs can make us sick if they get inside our bodies. Which of these actions helps the MOST to keep germs from getting inside our bodies?

- ☐ wearing warm clothes in the winter
- ☐ drinking plenty of water every day
- ☒ washing hands with soap and water
- ☐ eating fruits and vegetables every day

16 Which of these things is NOT made of cells?

- ☐ worm
- ☐ tree
- ☒ rock
- ☐ bird

17 The pictures below show five different animals.



Sparrow



Squirrel



Frog



Owl



Deer

These animals could be sorted into groups using many different features.

Describe ONE feature that some of the animals have that the other animals do NOT have.

In group 1 of the table below, list the names of the animals that have the feature. In group 2 of the table below, list the names of the other animals that do NOT have the feature.

Group 1 Have the feature	Group 2 Do NOT have the feature

Key Elements:

- any valid feature that could be used to separate these five animals into two distinct groups

AND

- all five animals are correctly sorted so that the animals listed in group 1 have the feature and the animals listed in group 2 do not have the feature

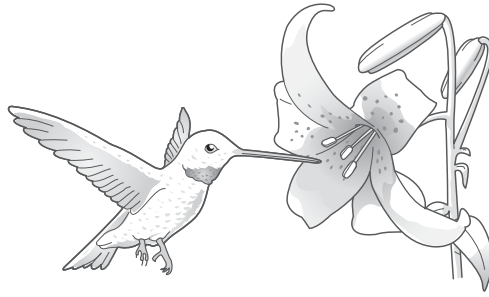
Rubric:

2 points Two key elements

1 point One key element

0 points Other

- 18** Look at the picture of the hummingbird and the flower shown below.



How does the flower help the hummingbird?

How does the hummingbird help the flower?

Key Elements:

How the flower helps the hummingbird

- The flower provides food/nectar for the hummingbird.

AND

How the hummingbird helps the flower

- The hummingbird helps the flower pollinate/reproduce.

Rubric:

2 points Two key elements

1 point One key element

0 points Other

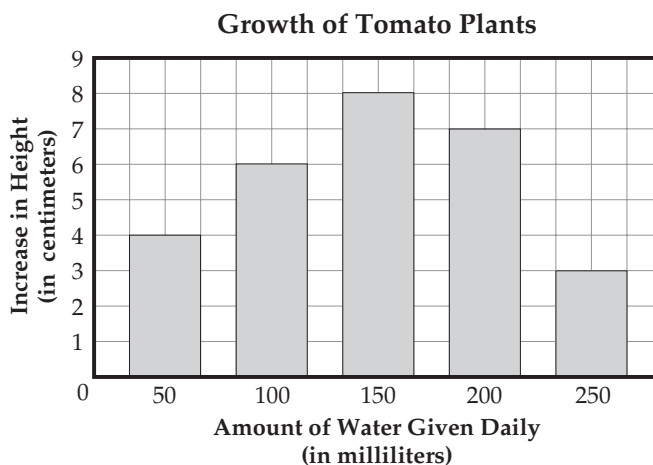
The Mathematical World

This standard assesses a student's understanding of the nature of measurement, appropriate units of measurement, the meaning of numerals in different scientific contexts, the construction and interpretation of tables and graphs, and the use of reasoning to identify patterns and numerical relationships.

19 Which of these measurements could be used to describe the mass of a glass of water?

- ☐ 10 degrees Celsius
- ☐ 15 centimeters
- ☐ 400 milliliters
- ☒ 600 grams

20 Isabella gave five tomato plants different amounts of water daily for two weeks and measured the growth of the plants. The graph below shows her results.



Which of these statements correctly describes the data in the graph?

- ☐ The plant given 50 milliliters of water grew the least.
- ☒ The plant given 150 milliliters of water grew the most.
- ☐ The plant given 200 milliliters of water grew the least.
- ☐ The plant given 250 milliliters of water grew the most.

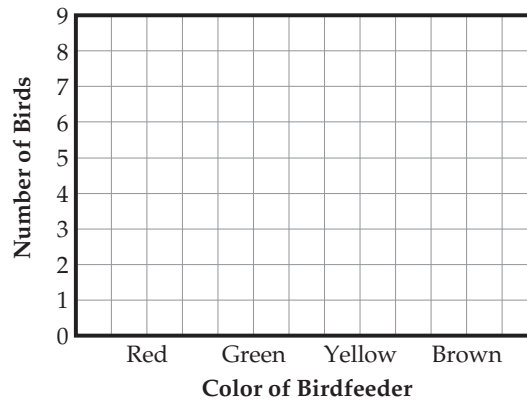
- 21** Jared investigated whether the color of a birdfeeder affects how many birds visit the birdfeeder. He covered the outside of a birdfeeder with a different color of paper each day. Then he counted the number of birds that visited the feeder during the same time period each day. The table below shows his results.

Birdfeeder Investigation

Color of Birdfeeder	Number of Birds
Red	7
Green	3
Yellow	8
Brown	4

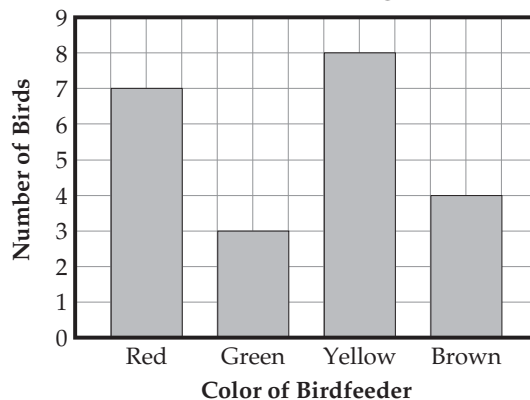
Use the information in the table to construct a BAR graph.

Birdfeeder Investigation



Key Elements:

- **Birdfeeder Investigation**



Rubric:

- 2 points** Four bars correctly drawn
- 1 point** Two or three bars correctly drawn
- 0 points** Other

Common Themes

This standard assesses a student's understanding of how parts interact and function within systems, how models can be used and changed, and how different kinds of changes occur over time and why those changes occur.

22 Antwan brought a flashlight to use on a camping trip, but the flashlight will not work. Which of these reasons could explain why the flashlight will NOT work?

- ☒ Its batteries are put in backwards.
- ☐ Its light bulb is not very powerful.
- ☐ It is made of plastic instead of metal.
- ☐ It is new and has not been used before.

23 Which of these features stays the SAME when an ice cube melts?

- ☒ its mass
- ☐ its shape
- ☐ its temperature
- ☐ its state of matter

24



Use your ruler to answer this question.

Anna is doing a science project at the local nature center. She needs to measure the length of a lizard once each month for three months to find out how fast it is growing.

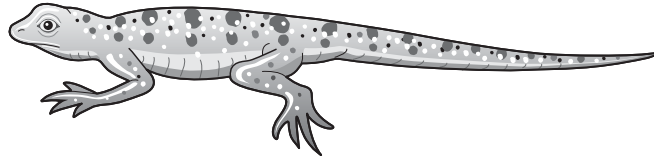
Month 1



Month 2



Month 3



What is the length, in centimeters, of the lizard shown for each month? Record your measurements in the table below.

Lizard Growth

Month	Length of Lizard (in centimeters)
1	
2	
3	

Key Elements:

- any measurements within the range listed for each cell

Lizard Growth

Month	Length of Lizard (in centimeters)
1	4.5 – 5.5
2	7.5 – 8.5
3	12.5 – 13.5

NOTE: Although units of measurement are not required to be listed for this item, do not accept a measurement if non-metric units are listed (e.g., 3 inches, etc.)

Rubric:

- 2 points** Three cells correctly filled in
- 1 point** One or two cells correctly filled in
- 0 points** Other

ISTEP+ Grade 5 Science Item Sampler

Indiana Statewide Testing for Educational Progress

